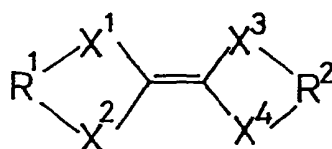


CLAIMS

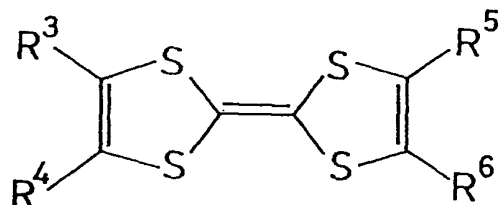
1. An electrochemical device comprising a positive electrode, a negative electrode and an electrolyte, wherein at least one of said positive and negative electrodes comprises a compound having a structure represented by the general formula (1):



where R<sup>1</sup> and R<sup>2</sup> are independent of each other and each represents a linear or cyclic aliphatic group; X<sup>1</sup>, X<sup>2</sup>, X<sup>3</sup> and X<sup>4</sup> are independent of each other and each represents a sulfur atom, an oxygen atom, a selenium atom or a tellurium atom; and said aliphatic group can comprise at least one selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom, a silicon atom, a phosphorus atom and a boron atom.

2. The electrochemical device in accordance with claim 1, wherein

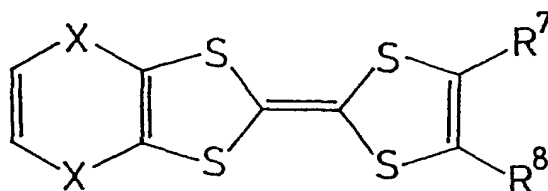
said compound is represented by the general formula (2):



where  $R^3$ ,  $R^4$ ,  $R^5$  and  $R^6$  are independent of each other and each represents a linear or cyclic aliphatic group, a hydrogen atom, a hydroxyl group, a cyano group, an amino group, a nitro group or a nitroso group; and said aliphatic group can comprise at least one selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom, a silicon atom, a phosphorus atom, a boron atom and a halogen atom.

3. The electrochemical device in accordance with claim 1, wherein

said compound is represented by the general formula (3):

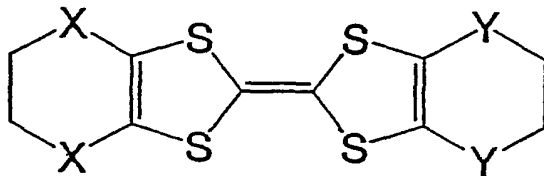


where  $R^7$  and  $R^8$  are independent of each other and each represents a linear or cyclic aliphatic group, a hydrogen atom, a hydroxyl group, a cyano group, an amino group, a nitro group or a nitroso group; X represents a sulfur atom, an oxygen atom, a selenium atom or a tellurium atom; and said aliphatic group can comprise at least one selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom, a silicon atom, a phosphorus atom, a boron atom and a halogen atom.

4. The electrochemical device in accordance with claim 1, wherein

said compound is represented by the general formula

(4):

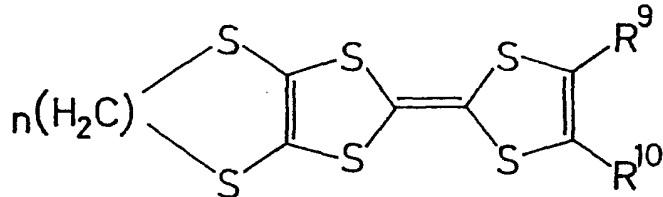


where X and Y are independent of each other and each represents a sulfur atom, an oxygen atom, a selenium atom, a tellurium atom or a methylene group.

5. The electrochemical device in accordance with claim 1, wherein

said compound is represented by the general formula

(5):



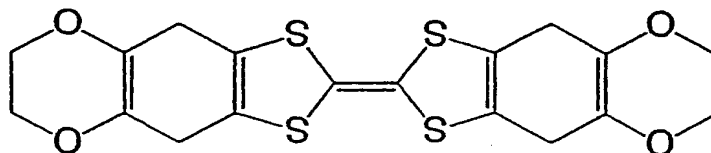
where  $R^9$  and  $R^{10}$  are independent of each other and each represents a linear or cyclic aliphatic group, a hydrogen atom, a hydroxyl group, a cyano group, an amino group, a nitro group or a nitroso group; said aliphatic group can comprise at least one selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom, a silicon atom, a phosphorus atom, a boron atom and a halogen atom; and n is not less than 1.

6. The electrochemical device in accordance with

claim 1, wherein

said compound is represented by the chemical formula

(6):



7. The electrochemical device in accordance with claim 1, wherein said compound comprises a polymer compound having a plurality of the structures represented by the general formula (1).

8. The electrochemical device in accordance with claim 7, wherein said polymer compound has a polyacetylene chain as a main chain.

9. The electrochemical device in accordance with claim 7, wherein said polymer compound forms a film.

10. The electrochemical device in accordance with claim 1, wherein said electrolyte comprises a solvent, and an anion and a cation dissolved in said solvent; and said compound is capable of forming a coordinate bond with said cation through an oxidation-reduction reaction.

11. The electrochemical device in accordance with claim 10, wherein said cation is a lithium ion.

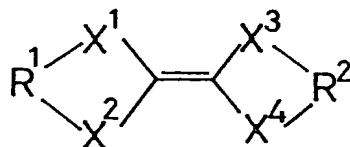
12. The electrochemical device in accordance with claim 1, wherein said electrolyte comprises a solvent, and an anion and a cation dissolved in said solvent; and said

compound is capable of forming a coordinate bond with said anion through an oxidation-reduction reaction.

13. The electrochemical device in accordance with claim 1, wherein said positive electrode includes said compound as a positive electrode active material; and said negative electrode includes a carbonaceous material as a negative electrode active material.

14. The electrochemical device in accordance with claim 1, wherein said positive electrode includes said compound as a positive electrode active material; and said negative electrode includes, as a negative electrode active material, at least one selected from the group consisting of a lithium metal, a lithium-containing composite nitride and a lithium-containing composite titanium oxide.

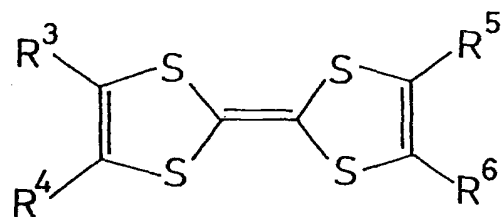
15. An electrode active material for an electrochemical device comprising a compound having a structure represented by the general formula (1):



where R<sup>1</sup> and R<sup>2</sup> are independent of each other and each represents a linear or cyclic aliphatic group; X<sup>1</sup>, X<sup>2</sup>, X<sup>3</sup> and X<sup>4</sup> are independent of each other and each represents a sulfur atom, an oxygen atom, a selenium atom or a tellurium atom; and said aliphatic group can comprise at least one

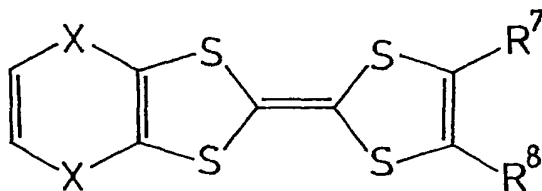
selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom, a silicon atom, a phosphorus atom and a boron atom.

16. The electrode active material for an electrochemical device in accordance with claim 15, wherein said compound is represented by the general formula (2):



where R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup> and R<sup>6</sup> are independent of each other and each represents a linear or cyclic aliphatic group, a hydrogen atom, a hydroxyl group, a cyano group, an amino group, a nitro group or a nitroso group; and said aliphatic group can comprise at least one selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom, a silicon atom, a phosphorus atom, a boron atom and a halogen atom.

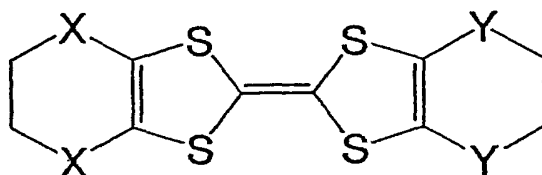
17. The electrode active material for an electrochemical device in accordance with claim 15, wherein said compound is represented by the general formula (3):



where  $R^7$  and  $R^8$  are independent of each other and each represents a linear or cyclic aliphatic group, a hydrogen atom, a hydroxyl group, a cyano group, an amino group, a nitro group or a nitroso group; X represents a sulfur atom, an oxygen atom, a selenium atom or a tellurium atom; and said aliphatic group can comprise at least one selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom, a silicon atom, a phosphorus atom, a boron atom and a halogen atom.

18. The electrode active material for an electrochemical device in accordance with claim 15, wherein said compound is represented by the general formula

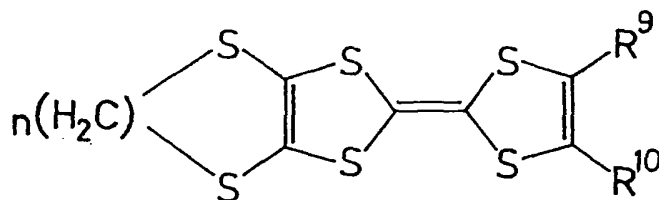
(4):



where X and Y are independent of each other and each represents a sulfur atom, an oxygen atom, a selenium atom, a tellurium atom or a methylene group.

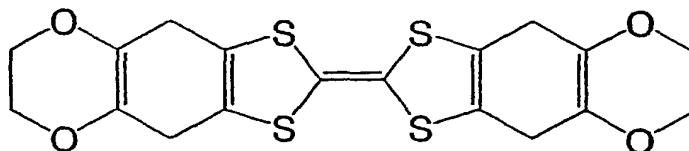
19. The electrode active material for an electrochemical device in accordance with claim 15, wherein said compound is represented by the general formula

(5):



where  $R^9$  and  $R^{10}$  are independent of each other and each represents a linear or cyclic aliphatic group, a hydrogen atom, a hydroxyl group, a cyano group, an amino group, a nitro group or a nitroso group; said aliphatic group can comprise at least one selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom, a silicon atom, a phosphorus atom, a boron atom and a halogen atom; and  $n$  is not less than 1.

20. The electrode active material for an electrochemical device in accordance with claim 15, wherein said compound is represented by the chemical formula (6):



21. The electrode active material for an electrochemical device in accordance with claim 15, wherein said compound comprises a polymer compound having a plurality of the structures represented by the general formula (1).

22. The electrode active material for an electrochemical device in accordance with claim 21, wherein said polymer compound has a polyacetylene chain as a main chain.

23. The electrode active material for an electrochemical device in accordance with claim 21, wherein said polymer compound forms a film.



24. The electrochemical device in accordance with claim 1, wherein at least one of said electrodes further comprises a substrate carrying said compound; and said substrate and said compound are bonded by a chemical bond.

25. The electrochemical device in accordance with claim 24, wherein said chemical bond is at least one selected from the group consisting of a covalent bond and a coordinate bond.

26. The electrochemical device in accordance with claim 25, wherein said covalent bond is at least one selected from the group consisting of an Si-O bond, a Ti-O bond and an amido bond.

27. The electrochemical device in accordance with claim 25, wherein said coordinate bond is a metal-sulfur bond.

28. The electrode active material for an electrochemical device in accordance with claim 15, further comprising a substrate carrying said compound, wherein said substrate and said compound are bonded by a chemical bond.